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## Appropriate Vaccine and Diluent Storage Conditions

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### Live Vaccines

Live vaccines are sensitive to heat. Both varicella vaccine and live attenuated influenza vaccine (LAIV) must be stored in a continuously frozen state in a freezer at 5°F (-15°C) or colder until administration. Varicella vaccine and LAIV deteriorate rapidly after they are removed from the freezer. Measles, mumps, and rubella vaccine (MMR) is routinely stored in

**Live vaccines  
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the refrigerator, but it also can be stored in the freezer. MMR and varicella vaccines are also sensitive to light, which causes loss of potency. These vaccines

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must be protected from light exposure at all times. Therefore, store MMR and varicella vaccines at the appropriate temperatures in their boxes with the tops on until they are needed.

## Inactivated Vaccines

Inactivated vaccines are sensitive to both excessive heat and freezing. They should be stored in a refrigerator at 35° to 46°F (2° to 8°C), with a desired average temperature of 40°F (5°C). Exposure to temperatures outside this range results in decreased vaccine potency and increased risk of vaccine-preventable diseases.

Inactivated vaccines are less sensitive to heat than live vaccines and can tolerate short periods of time outside the refrigerator, although the potency is adversely affected over time.

**Inactivated vaccines are sensitive to both excessive heat and freezing.**

## Lyophilized (Freeze-Dried) Vaccines and Diluents

MMR and varicella diluent is packaged separately from their corresponding lyophilized (freeze-dried) vaccines and can be stored at room temperature or in the refrigerator. To conserve space, diluents packaged separately from their vaccines may also be stored in the door of the refrigerator.

Diluents packaged with their vaccines (such as ActHIB® and meningococcal polysaccharide vaccine groups A, C, Y, and W-135) should be stored in the refrigerator next to their vaccines.

■ **Diluents packaged separately from their corresponding vaccines can be stored at room temperature or in the refrigerator.**

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## Vaccine Storage Locations and Positioning

### Freezers

In the freezer, vaccine should be stored in the middle of the compartment, away from the walls, coils, and peripheral areas. Vaccines should not be stored in the

freezer door. The temperature in the door is not stable and differs from that in the main compartment.

Varicella vaccine and live attenuated influenza vaccine (LAIV) may be stored in either a manual defrost or a frost-free freezer at 5° F (-15° C) or colder. The manufacturer supplied freezer box is no longer required for storage of LAIV vaccine in a frost-free freezer.



**Note**  
**Vaccines**  
**should not be**  
**stored in**  
**freezer door**

**In the freezer, vaccine should be stored in the middle of the compartment, away from the walls, coils, and peripheral areas.**

## **Refrigerators**

In the refrigerator, vaccine should be stored in the middle of the compartment, away from the coils, walls, floor, and cold air vent. The temperature near the floor of the refrigerator is not stable and differs from that in the middle of the compartment. For this reason, vaccine should never be stored in the vegetable bins. Vaccines should not be stored in the refrigerator door. The temperature in the door is not stable and differs from that in the main compartment. In a combination refrigerator-freezer unit, the top shelf of the refrigerator may be colder than the recommended temperature range because of cold air venting on it from the freezer. Refrigerated vaccines should always be stored far enough away from the air venting from the freezer compartment to avoid freezing the

vaccines. Ideally, vaccine should be stored on the middle shelf, away from the cold air vent. However, if vaccine can be situated away from the cold air vent, and the temperature in this area is within the recommended range, vaccine may also be stored on the upper shelf. If the upper shelf must be used for vaccine storage, it would be best to place MMR on this shelf because MMR is not sensitive to freeze exposure like the other refrigerated vaccines.

## Vaccine Spacing

Vaccine should be placed with space between the vaccine and the compartment wall, and with space between each large box, block, or tray of vaccine to allow for cold air circulation around the vaccine. Adequate cold air circulation helps each vaccine to reach a consistent temperature throughout its mass and is necessary for the storage unit to maintain a consistent temperature inside the compartment. Packing any vaccine storage unit too tightly will affect the temperature.

## Vaccine Packaging

Vaccine products that have similar packaging should be stored in different locations to avoid confusion and medication errors. For example, if you have pediatric and adult versions of the same vaccine, storing them in different locations lessens the chance that someone will inadvertently choose the wrong vaccine. Likewise, vaccines that have similar sounding names should be stored in different locations. For example, DT and Td vaccines might be easily confused, as could Hib and hepatitis B vaccines.

Air vent  
from freezer



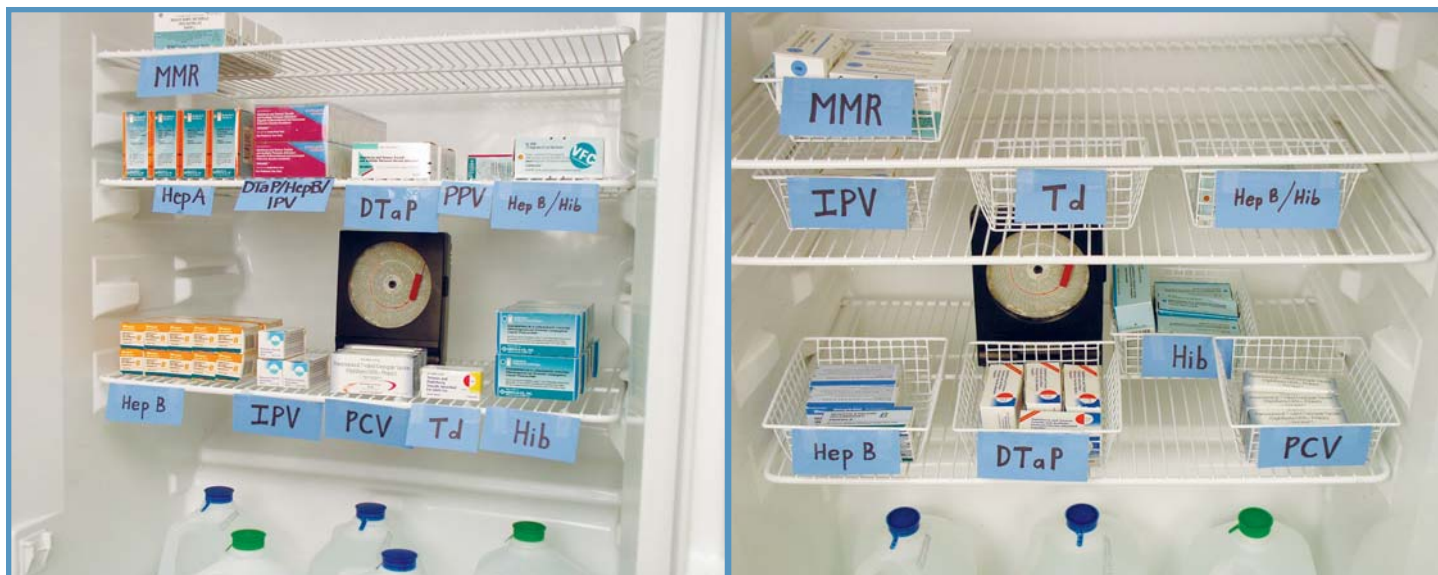
**Note**  
Diluents may be  
stored in  
refrigerator door.  
Vaccines  
should **not** be  
stored in  
refrigerator door.

In the refrigerator, vaccine should be stored in the middle of the compartment, away from the walls and coils and off the floor.



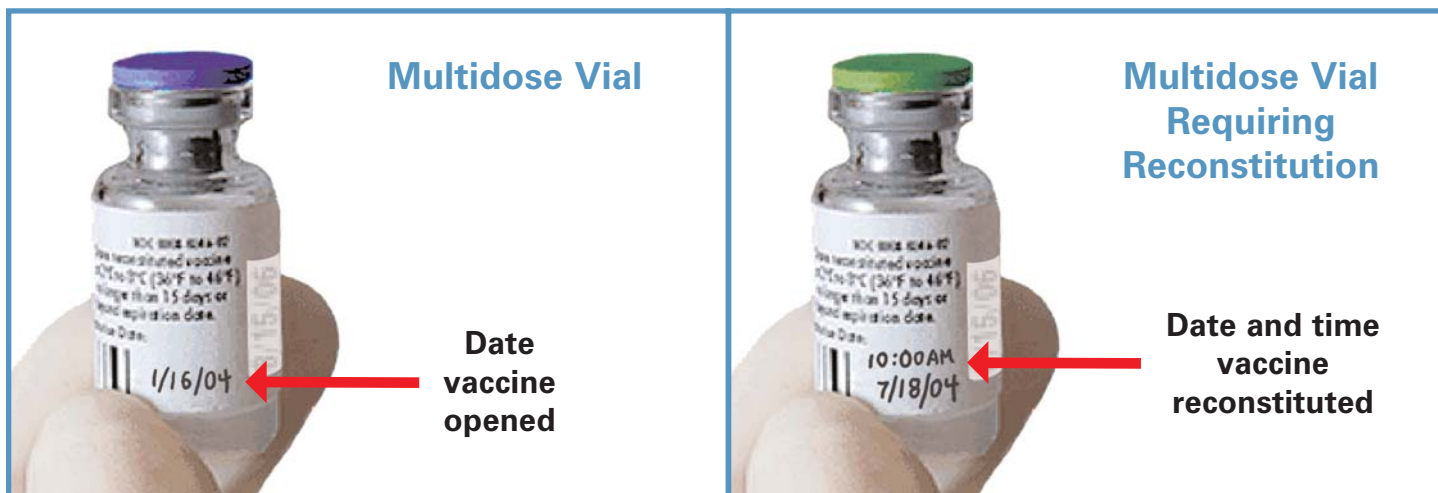
## Labeling

The location of each specific vaccine inside the storage unit should be clearly labeled. This can be accomplished by attaching labels directly to the shelves on which the vaccines are sitting or by labeling trays on which boxes of the same vaccine type are placed. Storing each vaccine in its own specifically labeled section of the refrigerator or freezer helps decrease the chance that someone will mistakenly administer the wrong type of vaccine.



Attach labels directly to the shelves on which the vaccines are sitting or label trays or containers according to the vaccines they contain.

In addition to labeling the location of vaccines, mark each opened multidose vial with the **date** it was first opened. Mark reconstituted vaccine with the **date and time** it was reconstituted. Dating these vials is important for two reasons.



Mark each opened multidose vial with the date it was first opened.  
Mark each reconstituted vaccine with the date and time it was reconstituted.

First, some vaccines expire within a certain time after opening or after reconstitution. This may not correspond to the expiration date printed on the vial by the manufacturer. For example, multidose vials of meningococcal vaccine should be discarded if not used within 35 days after reconstitution, even if the expiration date printed on the vial by the manufacturer has not passed. Second, dating opened or reconstituted vials helps manage vaccine inventory by identifying vials that should be used first. Whenever possible, use all the vaccine in one multidose vial before opening another vial. Similarly, use all the reconstituted vaccine in one vial before reconstituting another vial. This policy helps to reduce vaccine waste.

Diluents should be clearly labeled, whether they are stored at room temperature or in the refrigerator. Label the boxes of corresponding vaccines and diluents from the same manufacturer so that they will be used together. This avoids confusion and helps to ensure that you use only the specific diluent provided by the manufacturer for each type of lyophilized (freeze-dried) vaccine. This is particularly important if you store two or more lyophilized vaccines using different diluents.



Diluents should be clearly labeled, whether they are stored at room temperature or in the refrigerator.

## **Storage Containers**

### **Vaccine Boxes**

To avoid confusion, vaccine boxes should be stored together by type and arranged in rows. Boxes should be stacked according to expiration date with the short-dated vaccines closer to the front of the storage unit compartment for easy access.

Store all opened and unopened vials of vaccine in their boxes inside the appropriate storage unit so that their contents and expiration dates are easily identifiable. MMR and varicella vaccines should always be stored in their boxes with the lids on to protect them from light. Storing loose vaccine vials outside of their boxes is not recommended. This practice makes inventory management more difficult, makes tracking expiration dates more difficult, predisposes to administration errors when vials are confused, and exposes the vaccines to light.

**Store all opened and unopened vials of vaccine in their boxes inside the appropriate storage unit.**

## **Trays and Containers**

Trays and containers may be used to organize vaccine boxes. Each tray or container should only store vaccine of the same type. Other medications and biologic products, if they must be stored in the vaccine storage unit, must not be stored on the trays or in the containers to avoid medication errors. Clearly label the tray or container with the name of the vaccine and place vaccine boxes of that type on the tray or in the container inside the refrigerator or freezer. Trays and containers must not be stacked or placed so closely together that air circulation inside the vaccine storage unit compartment is impeded.

## **Storage of Non-Vaccine Products**

### **Food and Beverages**

Never store food or beverages inside the vaccine refrigerator or freezer. This practice results in frequent opening of the storage unit door and greater chance for temperature instability and excessive exposure to light. It may also result in spills and contamination inside the compartment.



**Never store food or beverages inside the vaccine refrigerator or freezer.**



## Medications and Other Biologic Products

If possible, other medications and other biologic products should not be stored inside the vaccine storage unit. If there is no other choice, these products must be stored below the vaccines on a different shelf. This prevents contamination of the vaccines should the other products spill, and reduces the likelihood of medication errors.